AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1. (Original) A method for detecting and determining the quantity of bacteria that oxidize ammonia to nitrite in a medium, wherein the 16S rDNA of the bacteria includes a nucleotide sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3 and SEQ ID NO:4, comprising:

providing a detectably labeled probe including a nucleotide sequence as set forth in selected from the group consisting of SEQ ID NO:5 and SEQ ID NO:8;

isolating total DNA from the medium;

exposing the isolated total DNA to the detectably labeled probe under conditions under which the probe hybridizes to only the nucleic acid of bacteria having 16S rDNA including the nucleotide sequence; and

detecting and measuring the amount of hybridized probe,

wherein the presence of hybridized probe is indicative of the presence of bacteria that oxidize ammonia to nitrite and the amount of hybridized probe is indicative of the quantity of said bacteria that oxidize ammonia to nitrite in said medium.

2. (Original) The method of claim 1, wherein the medium is selected from the group consisting of aquarium water, freshwater, saltwater and wastewater.

3. (Original) The method of claim 1, wherein the medium includes a material selected from the group consisting of aquarium gravel, filter sponges, filter floss and plastic filter media.

4. (Original) The method of claim 3, wherein the total DNA is isolated from the material.

5. (Original) The method of claim 1, wherein providing a detectably labeled probe further comprises including the detectably labeled probe on a DNA chip.

6. (Original) The method of claim 1, wherein the method for detecting and determining the quantity of bacteria that oxidize ammonia to nitrite in a medium is an automated process.

7. (Original) The method of claim 6, wherein the automated process is selected from the group consisting of DNA microarray, protein microarray, biosensor, bioprobe, capillary electrophoresis and real-time PCR.

8. (Original) A method for detecting and determining the quantity of bacteria that oxidize ammonia to nitrite in a medium, wherein the 16S rDNA of the bacteria includes a nucleotide sequence selected from the group consisting of SEQ ID NO:18, SEQ ID NO:19 and SEQ ID NO:20 comprising:

providing a detectably labeled probe including a nucleotide sequence as set forth in SEQ ID NO:21;

isolating total DNA from the medium;

exposing the isolated total DNA to the detectably labeled probe under conditions under which the probe hybridizes to only the nucleic acid of bacteria having 16S rDNA including the nucleotide sequence; and

detecting and measuring the amount of hybridized probe,

wherein the presence of hybridized probe is indicative of the presence of bacteria that oxidize ammonia to nitrite and the amount of hybridized probe is indicative of the quantity of said bacteria that oxidize ammonia to nitrite in said medium.

9. (Original) The method of claim 8, wherein the medium is selected from the group consisting of aquarium water, freshwater, saltwater and wastewater.

10. (Original) The method of claim 8, wherein the medium includes a material selected from the group consisting of aquarium gravel, filter sponges, filter floss and plastic filter media.

11. (Original) The method of claim 10, wherein the total DNA is isolated from the material.

12. (Original) The method of claim 8, wherein providing a detectably labeled probe further comprises including the detectably labeled probe on a DNA chip.

13. (Original) The method of claim 8, wherein the method for detecting and determining the quantity of bacteria that oxidize ammonia to nitrite in a medium is an automated process.

14. (Original) The method of claim 13, wherein the automated process is selected from the group consisting of DNA microarray, protein microarray, biosensor, bioprobe, capillary electrophoresis and real-time PCR.

15. (Original) A method for detecting and determining the quantity of bacteria that oxidize ammonia to nitrite in a medium, wherein the 16S rDNA of the bacteria includes a nucleotide sequence selected from the group consisting of: a nucleotide sequence that has greater than 98% identity over the full length thereof to SEQ ID NO:3, a nucleotide sequence that has greater than 98% identity over the full length thereof to SEQ ID NO:4, a nucleotide sequence that has at least 96% identity over the full length thereof to SEQ ID NO:1 and a nucleotide sequence that has at least 96% identity over the full length thereof to SEQ ID NO:2, comprising:

providing a detectably labeled probe that has at least 96% identity over the full length thereof to a nucleotide sequence as set forth in selected from the group consisting of SEQ ID NO:5 and SEQ ID NO:8;

isolating total DNA from the medium;

exposing the isolated total DNA to the detectably labeled probe under conditions under which the probe hybridizes to only the nucleic acid of bacteria having 16S rDNA including the nucleotide sequence; and

detecting and measuring the amount of hybridized probe,

wherein the presence of hybridized probe is indicative of the presence of bacteria that oxidize ammonia to nitrite and the amount of hybridized probe is indicative of the quantity of said bacteria that oxidize ammonia to nitrite in said medium.

16. (Original) The method of claim 15, wherein the medium is selected from the group consisting of aquarium water, freshwater, saltwater and wastewater.

17. (Original) The method of claim 15, wherein the medium includes a material selected from the group consisting of aquarium gravel, filter sponges, filter floss and plastic filter media.

18. (Original) The method of claim 17, wherein the total DNA is isolated from the material.

19. (Original) The method of claim 15, wherein providing a detectably labeled probe further comprises including the detectably labeled probe on a DNA chip.

20. (Original) The method of claim 15, wherein the method for detecting and determining the quantity of bacteria that oxidize ammonia to nitrite in a medium is an automated process.

21. (Original) The method of claim 20, wherein the automated process is selected from the group consisting of DNA microarray, protein microarray, biosensor, bioprobe, capillary

electrophoresis and real-time PCR.

22. (Original) A method for detecting and determining the quantity of bacteria that oxidize ammonia to nitrite in a medium, wherein the 16S rDNA of the bacteria includes a nucleotide sequence selected from the group consisting of: a nucleotide sequence that has at least 96% identity over the full length thereof to SEQ ID NO:18, at least 96% identity over the full length thereof to SEQ ID NO:19 and at least 96% identity over the full length thereof to SEQ ID NO:20, comprising:

providing a detectably labeled probe that has at least 96% identity over the full length thereof to a nucleotide sequence as set forth in SEQ ID NO:21;

isolating total DNA from the medium;

exposing the isolated total DNA to the detectably labeled probe under conditions under which the probe hybridizes to only the nucleic acid of bacteria having 16S rDNA including the nucleotide sequence; and

detecting and measuring the amount of hybridized probe,

wherein the presence of hybridized probe is indicative of the presence of bacteria that oxidize ammonia to nitrite and the amount of hybridized probe is indicative of the quantity of said bacteria that oxidize ammonia to nitrite in said medium.

23. (Original) The method of claim 22, wherein the medium is selected from the group consisting of aquarium water, freshwater, saltwater and wastewater.

24. (Original) The method of claim 22, wherein the medium includes a material selected from the group consisting of aquarium gravel, filter sponges, filter floss and plastic filter media.

25. (Original) The method of claim 24, wherein the total DNA is isolated from the material.

26. (Original) The method of claim 22, wherein providing a detectably labeled probe further comprises including the detectably labeled probe on a DNA chip.

27. (Original) The method of claim 22, wherein the method for detecting and determining the quantity of bacteria that oxidize ammonia to nitrite in a medium is an automated process.

28. (Original) The method of claim 27, wherein the automated process is selected from the group consisting of DNA microarray, protein microarray, biosensor, bioprobe, capillary

electrophoresis and real-time PCR.

29. (Canceled) A DNA chip comprising:

a solid substrate; and

a probe including a nucleotide sequence selected from the group consisting of SEQ ID NO:5 and SEQ ID NO:8 configured upon the solid substrate.

30. (Canceled) The DNA chip of claim 29, wherein the probe is attached to the solid substrate by covalent bonding.

31. (Canceled) A DNA chip comprising:

a solid substrate; and

the probe including a nucleotide sequence as set forth in SEQ ID NO:21 configured upon the solid substrate.

32. (Canceled) The DNA chip of claim 31, wherein the probe is attached to the solid substrate by covalent bonding.